

REMARKS

Status of the claims

Claims 1, 4, and 8-9 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Andriessen (U.S. Patent Application Publication No. 2002/0151094). Claims 2-3 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen in view of Danek (“Electrospray Organometallic Vapor Deposition - A Novel Technique for Preparation of Quantum Dot Composites”). In addition, claims 5 and 7 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen in view of Mensz (U.S. Patent No. 5,422,902). Claim 6 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen in view of Bulovic (U.S. Application Publication No. 2004/0023010). Further, claim 10 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen in view of Hayashi (U.S. Application Publication No. 2002/0167280). Claim 11 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen in view of U.S. Application Publication No. 2004/0265624 (“Shitagaki”). Finally, claims 12-13 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen.

Response to rejection of claims 1, 4, and 8-9 under 35 U.S.C. § 102(b) based on Andriessen

Claims 1, 4, and 8-9 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Andriessen. Applicant respectfully traverses because (1) Andriessen does not disclose or suggest that nanocrystals are dispersed as luminescent centers in the ambipolar inorganic semiconductor material disclosed therein; and (2) Andriessen does not disclose or suggest the presently recited inorganic light emitting layer.

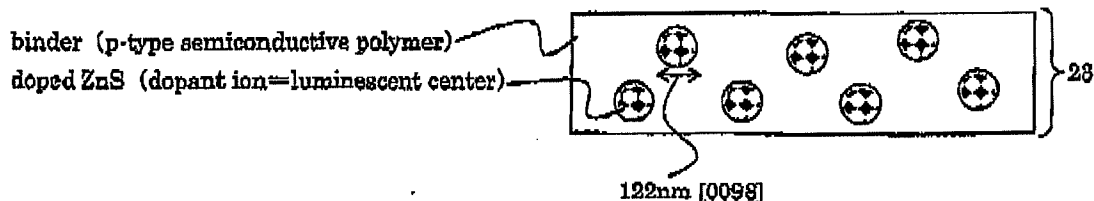
The present claims recite a quantum dot-dispersed light emitting device comprising: a substrate; an electron injection electrode; a hole injection electrode; and an inorganic light emitting layer disposed so as to be in contact with both the electrodes. The inorganic light emitting layer includes an ambipolar inorganic semiconductor material and nanocrystals dispersed as luminescent centers in the ambipolar inorganic semiconductor material, and is configured without having, at the interface with the electron injection electrode and/or the hole injection electrode, epitaxial relation therewith.

Applicants respectfully traverse because Andriessen does not disclose or suggest that nanocrystals are dispersed as luminescent centers in the ambipolar inorganic semiconductor material disclosed therein. The Office Action sets forth the position that the dopants (such as Cu, Ag, Tb, Eu, and Au) disclosed by Andriessen correspond to the presently recited nanocrystals dispersed as luminescent centers in the ambipolar inorganic semiconductor material, citing Paragraph No. [0066] of Andriessen to support this position. However, Applicants note that Andriessen does not anticipate the presently claimed invention because nowhere in Andriessen does it state or disclose that the dopants are nanocrystals. Accordingly, Andriessen does not teach or disclose a nanocrystal, as recited in the presently claimed invention, and therefore does not anticipate the present claims.

Applicants also respectfully submit that Andriessen does not disclose the presently recited “inorganic light emitting layer.” The Office Action sets forth the position that members 22 and 23 of Fig. 1(a) of Andriessen correspond to the presently recited “inorganic light emitting layer.” Applicants disagree with this interpretation of Andriessen. First, Applicants submit that as seen in Fig. 1(a), elements 21 and 22 are similar to each other (see the designation of 21+22 in the figure). Second, element 23 differs from the presently recited “inorganic light emitting

layer” because (1) it is organic; and (2) quantum dots are not dispersed therein. Instead, Andriessen discloses that ZnS is dispersed in the layer, doped with a luminescent center ion. With respect to the dispersion of quantum dots, Andriessen does not disclose this element of the present claims, in part because simply due to its size, it is clear that the ZnS in Andriessen is not a quantum dot. Accordingly, Andriessen does not disclose or suggest the presently recited inorganic light emitting layer.

For the Examiner’s ease of reference, Applicants submit below a graphical representation of the light emitting layer 23 in Andriessen.



Applicants therefore respectfully submit that Andriessen does not anticipate or render obvious the presently claimed invention because (1) Andriessen does not disclose or suggest that nanocrystals are dispersed as luminescent centers in the ambipolar inorganic semiconductor material disclosed therein; and (2) Andriessen does not disclose or suggest the presently recited inorganic light emitting layer. Applicants therefore respectfully request the reconsideration and withdrawal of this § 102 rejection.

Response to rejection of claims 2-3 under 35 U.S.C. § 103(a) based on Andriessen in view of Danek

Claims 2-3 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen in view of Danek. Applicants submit that Danek does not remedy the above deficiencies found within Andriessen, and therefore respectfully submit that the cited references

do not render obvious the presently claimed invention. Applicants therefore respectfully request the reconsideration and withdrawal of this § 103 rejection.

Response to rejection of claims 5 and 7 under 35 U.S.C. § 103(a) based on Andriessen in view of Mensz

Claims 5 and 7 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen in view of Mensz. Applicants submit that Mensz does not remedy the above deficiencies found within Andriessen, and therefore respectfully submit that the cited references do not render obvious the presently claimed invention. Applicants therefore respectfully request the reconsideration and withdrawal of this § 103 rejection.

Response to rejection of claim 6 under 35 U.S.C. § 103(a) based on Andriessen in view of Bulovic

Claim 6 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen in view of Bulovic. Applicants submit that Bulovic does not remedy the above deficiencies found within Andriessen, and therefore respectfully submit that the cited references do not render obvious the presently claimed invention.

Applicants also respectfully traverse on the basis that Bulovic does not disclose or suggest the use of nanocrystals as luminescent centers in an ambipolar inorganic semiconductive material, and it would not be obvious to use such nanocrystals in the material disclosed within Andriessen.

Applicants therefore respectfully request the reconsideration and withdrawal of this § 103 rejection.

Response to rejection of claim 10 under 35 U.S.C. § 103(a) based on Andriessen in view of Hayashi

Further, claim 10 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen in view of Hayashi. Applicants submit that Hayashi does not remedy the above deficiencies found within Andriessen, and therefore respectfully submit that the cited references do not render obvious the presently claimed invention. Applicants therefore respectfully request the reconsideration and withdrawal of this § 103 rejection.

Response to rejection of claim 11 under 35 U.S.C. § 103(a) based on Andriessen in view of Shitagaki

Claim 11 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen in view of Shitagaki. Applicants submit that Hayashi does not remedy the above deficiencies found within Andriessen, and therefore respectfully submit that the cited references do not render obvious the presently claimed invention.

In addition, Applicants note that the Office Action relies upon Shitagaki for its alleged teaching of a gate electrode between the electron injection electrode and the hole injection electrode. However, Shitagaki does not disclose or suggest the presence of a gate electrode according to the present claims.

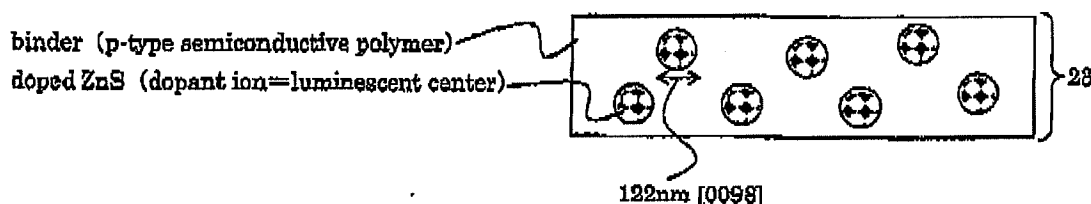
Applicants therefore respectfully request the reconsideration and withdrawal of this § 103 rejection.

Response to rejection of claims 12-13 under 35 U.S.C. § 103(a) based on Andriessen

Finally, claims 12-13 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Andriessen. Applicants respectfully submit that these claims are not rendered

obvious by Andriessen for the same reasons that Andriessen does not anticipate the present claims. In addition, it would not be obvious to substitute an ambipolar material, such as is recited in the present claims, for the light emitting layer in Andriessen.

Reproduced below is Applicants' graphical representation of the light emitting layer 23 in Andriessen.



As shown in the graphical representation, the presently recited “ambipolar inorganic light emitting layer” of the present invention allegedly corresponds to binder (23) in Andriessen, which is composed of a p-type semiconductive polymer. As is therefore apparent, the binder of Andriessen is not ambipolar, and thus does not meet the recitation in the present claims that “the light emitting layer is composed of an ambipolar material,” “the light emitting layer is composed of an inorganic material,” and “the light emitting layer includes a quantum dot as a luminescent center.” Such claim elements are not disclosed or suggested within Andriessen, and such elements would not be obvious to a person having ordinary skill in the art upon reviewing the disclosure of Andriessen or any of the other cited references.

Further, Applicants note that Paragraph Nos. [0047] and (0048] of Andriessen only disclose a manufacturing method of a material for forming a doped ZnS, but do not cure the deficiencies noted in Andriessen above.

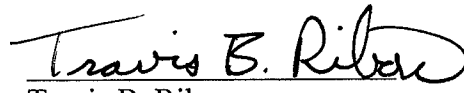
In view of the above, Applicants respectfully submit that the presently claimed invention is not rendered obvious by Andriessen. Applicants therefore respectfully request the reconsideration and withdrawal of this § 103 rejection.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


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Date: January 30, 2009